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USING LED INFLATABLE WIND TURBINE AS WARNING PROTECTIVE ELEMENTS ON THE ROAD

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Introduction

Nowadays the role of alternative energy has significantly increased. This is not only because of the possible depletion of the traditional fuels such as coal, gas and oil, but also the negative impact of emissions and wastes on the environment when it is used. There is also an important civilization' development factor that includes: 1) the desire of countries deprived of carbon resources do not depend on the world's oil and gas suppliers, 2) production safety, 3) low level of man-made disasters. The main sources of alternative energy are used worldwide:

- 1) Wind Energy
- 2) Solar energy
- 3) Biofuels
- 4) Tidal energy
- 5) Geothermal energy
- 6) Nuclear energy
- 7) Chemical electricity- galvanic sources and fuel cells.

Geopolitics has an impact on the development of alternative power (science, the main object of which is the geopolitical structure of the world, represented by a variety of regional models).

The total annual capacity of solar radiation on the southern borders of Russia, located on the 41st parallel and the most northern point - 82 degrees north latitude, is 1300 and 810 kWh / sq. m, respectively. The average rate in the country at the latitude

of 55 degrees is equal to 1.69 kWh / sq. m in January and 11.41 kWh / sq. m July daily. Wind speed across Russian regions is even more stable - its average speed over most of the territory is about 5 m./s., which corresponds to the weak or in the northern regions moderate (up to 7 m./s.) wind. Data power values is enough to build alternative power plants and to provide electricity to decentralized individual consumers and large industrial enterprises. But unfortunately, the statistics has shown that the use of renewable energy sources in the Russian Federation is very low (0.6% are alternative power as a whole share of the total energy consumed), for example, compared with the countries of the European Union (20-50% consumed resources amount in total).

Wind energy is thought to be abundant, clean and safe. The main advantage of the wind turbine as an energy source is free electricity (except for initial investment). Paying a certain sum of money once you solve the problem of energy independence for decades. Wind energy - the energy sector, specializing in the conversion of kinetic energy of air masses in the atmosphere in the electrical, mechanical, thermal, or in any other form of energy suitable for application in the economy. Most scientists believe that wind turbines are one of the cheapest and most promising among other sources of alternative energy.

In 1931, the world's first wind power station was put into operation in the Crimea, developed in the USSR. Today, wind energy is the most developed in Greece, USA, Australia, New Zealand and some Latin American countries. Practice has shown that the wind turbine pays back in 1-1.5 years. In addition, the service life of wind turbines is much higher than the rate in heat engines.

Dean Cayman LED inflatable wind turbine

At the moment, there are different types of wind turbines: paddle, sailing, inflatable. The last is of a great interest for our report. The inflatable windmill was relatively recently invented by famous American innovator Dean Cayman. Inflatable Cayman windmill is composed of two or more curved blades which are refilled by compressor that receives signals from embedded electronics. Integrated Control System collects signals from sensors about wind speed and direction, air temperature. Amenable to this information of the weather conditions, equipment in a timely manner inflates the rotor, or vice versa releases him from the air. The control system constantly monitors the pressure inside the structure and adjust it to change the shape of the rotor according to external conditions. In Dean's opinion, its light weight should help to reduce the threshold of wind speed at which such installation will fail.

The main advantages over classical turbines are that, that inflatable wind turbine is light and mobile. Inflatable design allows you to quickly relocate the power plant to a new location without any loss of material or structural damage. Also, the inventor in the patent has indicated that the wind turbine is equipped with a set of LEDs that will operate again from the turbine itself, as the sensors could regulate flashing of the LEDs so that the rotor is turned into a whirling display. Such a wind turbine could be used as the original billboard without the cost of its electricity.

As it is known, LED lights on the basis of the wind turbine and other alternative energy sources are not new. LED lighting is one of the most promising directions of artificial lighting technologies based on the use of radiation semiconductors. LEDs have many advantages to conventional lighting.

1) LEDs are used efficiently energy compared to previous generations of electric light sources - arc, incandescent and HID. Their light output is up to 150 lumens per watt! It is 4 - 6 times more economical lighting the most energy-saving lamps.

2) You can save energy for 5-10 times. That the ever-increasing electricity tariffs it brings considerable profit. Efficiency of conventional incandescent lamp is 4%, the efficiency of LEDs is 58%.

3) The life of LED systems is up to 100 thousand hours of continuous operation that 50-200 times more than incandescent and 4-16 times greater than that of fluorescent lamps.

4) Absolute resistance to multiple on and offs, which also increases the service life.

5) Ability to create any range without the use of filters.

6) Due to the small size of the LED, there could be created any design lamps and fixtures, including vandal-proof.

7) High durability - LED lamps are highly resistant to mechanical vibrations and shock.

8) Environmentally friendly - no radioactive radiation, LED lamps do not contain mercury, which excludes the poisoning operation and does not require special disposal.

9) It hasn't small ultraviolet and infrared radiation, no stroboscopic effect (pulsation, flicker).

10) Wide temperature range - LED lamps operate in any weather conditions at temperatures from -40°C to $+50^{\circ}\text{C}$.

LED lighting products are divided into the outside and inside (for interior). Today they are used for the illumination of buildings, cars, streets and advertising structures, fountains, tunnels and bridges. This lighting is used to illuminate the industrial and office space for the light poultry farms, aquariums, greenhouses, home furnishing and furniture. LED lighting is used in lighting technology to create special lighting design contemporary design projects. Reliability of LED light sources allows to use in remote places for frequent replacement (integrated ceiling lighting, suspended ceilings inside, and so on. D.). They are widely used in landscape design in the industry, when decorating the house and street lighting. Therefore, the idea of Dean Cayman covering design inflatable wind turbine LEDs essentially has introduced nothing new. But do not forget about the two main advantages of this windmill: lightness and mobility that make it unique with respect to its predecessors.

Inflatable wind turbine application

In this article we want to suggest an idea of using LED inflatable wind turbine as warning protective elements on the road. Road services use plastic traffic cones which

fence around dangerous parts on the road perfectly in the daytime, but it is inconspicuous to the driver at night on an unlit road. Traffic cones - warning symbols, which are used to restrict areas. It can be the location where the construction or repair work as well as they can act as a temporary markings. They are made mainly of plastics. They have a conical shape of different sizes, usually with a small area at the bottom. This form provides a high level of road cone. The most common color of a traffic cone is orange or red, often with white, black or yellow horizontal stripes. Traffic cones are used as a guard during the road construction works, to distribute traffic or to indicate the emergency sections and place of the accident. Also it is used as sports equipment and driver training. It can be equipped with additional weight. Traffic cones contain reflective elements, so they are visible only when they are adjudged to bright light. In the conditions of darkness or fog cones will be visible only when the dipped beam headlamps illuminate them. The average range of the dipped beam does not exceed 60 meters, respectively, until the vehicle comes close to this distance, it doesn't notice fenced area. The braking distance for the vehicle is between 25 to 150 meters, depending on the weather conditions, speed, road quality, weight of the vehicle. Therefore, if the driver does not notice the road fence at a distance of 60 meters, and it is possible that the vehicle cannot slow down and there will be an accident with serious consequences.

Unfortunately, statistics of the number of accidents due to non-compliance with rules and protections norms by road services is terrible. According to official statistics, due to poor road fencing for the entire 2012 in the country there was 42,772 accidents, while for 10 months of 2013 such incidents recorded for 43,066. LED inflatable wind turbines application would significantly reduce the number of accidents which are caused during poor visibility and repairing works on the road. They won't yield to the characteristics of traffic cones. Inflatable wind turbines also have low weight, mobility and ease of use. Such windmill lightened area can reach 400 meters. In addition, they will be visible in all weather conditions: fog, rain, snow, blizzard, night-time, which is very important for the driver. The device is fully autonomous, it doesn't require any connections to communications and can be used anywhere where there is a breeze. In order to avoid excessive wear in the daytime it is switched off and when it is dark is automatically goes on. Unfortunately, there is a problem of wind forces changing, that leads to the voltage drops. For resolving this problem, it can be possible to integrate batteries into the design - then the accumulated day energy will be used for lighting at night in low wind speed. There are a few types of energy storage: condenser, gravity, flywheel, pneumatic, chemical battery, hoisting. Different energy storage devices work different physical and chemical principles, but the most widely used commercial drives are electrochemical batteries. Also, it is the most suitable energy source for alternative energy.

Network drive power (NDP) is multifunctional device that allows you to store many times and give back electricity, increasing the reliability and quality of electricity supply networks and connected to them consumers and providing energy saving modes. Energy storage structural network includes three functional blocks:

- large capacity battery pack;

- an inverter unit (AC converters in constant or vice versa);
- intelligent drive management system that provides:
 - Measurement of parameters and control of operating modes of the drive;
 - Safe mode charge / discharge of the battery;
 - Storage of emergency control;
 - Blocking unauthorized activities and protection equipment.

Network energy storage is based on the bi-directional inverter (DC/AC converter) based on PWM technology using high-controlled keys (IGBT technology) and intelligent control system, the advanced functionality of the system. If our idea is put into action, it would be possible to set the colors, which would correspond to certain types of fences (repairs, accident, and pad layout). If this idea put into action, it would be possible to set the color, which would correspond to certain types of fences (repairs, accident, and pad layout).

The main problem of all inventions and innovations is the price. It is believed that the wind turbine is too expensive. This is partly true. The price of the bladed wind turbine can reach 100 thousand euros. This is due to the high cost of manufacturing blades, a complicated structure and installation. These costs won't occur for an inflatable wind turbine. However, the cost of production of such lamp is very low, and it is easy to improve the design. Increasing the size of the wind turbine can proportionally increase the number of LEDs and create a brighter light output. Using a set of compact devices of this type, you can illuminate objects in the sea or on the coast with virtually no energy.

Comparing with others alternative sources of energy

Probably most of you are wondering why we have chosen inflatable wind turbine rather than a classic turbine or a solar panel. Because they all have significant drawbacks for fencing, if you look at other sources of energy. For example, solar cells have a low efficiency, are very sensitive to mechanical stress. Operability of solar cells depends on the local climatic conditions, time of day and year. In mid-summer, in July, the light period in which the battery effectively gives energy, usually lasts no more than 7-9 hours. The most effective time for solar battery is 10 to 17 hours. After this time, the solar cell current falls. Current is reduced, which it is generated by solar panels in cloudy weather. Some solar orientation relative to the position of the sun, helps to increase the current generated by them, but the daily orientation batteries is quite difficult. In addition, solar panels are very expensive in modern Russian conditions. Lowering the temperature of the battery is below 0 ° C leads to a significant reduction in their efficiency. Bladed wind turbines are difficult to install. They cannot be transferred from one place to another, have high costs, as well as the cause of death of the birds. You also need to remember that wind power blade makes a noise. The more powerful the wind turbine, the greater the noise. Therefore, you are going to suffer from constant headaches due to noise. Only wind turbines can interfere with radio and television. Because of these characteristics of LED inflatable wind turbine is the most suitable candidate for the role of warning the protective element.

Conclusion

Science does not stand still, and as a result wind power today is experiencing a rebirth. The ever-growing energy needs of humanity today appear mainly due to the processing of conventional fuel. Number of fuel is limited, and as a result the world will face serious energy problems. Reserves of traditional energy sources will be exhausted and this fact makes humankind actively seek for alternative (Renewable) Energy Sources. Proof of wind power development is the creation and modernization of wind turbines. Dean Cayman invention can not only replenish types of wind turbines, but also is useful to find its practical application in life, particularly in the fencing of dangerous sections of the road. This wind turbine will be able to solve some pressing problems of reducing number of road accidents.

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GLOBALIZATION PROCESSES OF THE RUSSIAN FEDERATION

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Abstract

Article is devoted to processes of globalization in the Russian Federation. Nowadays, the process of globalization is changing the structure of the world economy. Russia, along with other countries, is involved in process of a close interlacing of world economic systems. In the last decade, Russia has moved on the way of integration into the world economy. In this article influence of globalization processes on national economy is considered, positive and negative consequences are revealed. The place of Russia in world economy is analyzed. Options of the directions of further development of the Russian Federation during world globalization are defined. The chosen theme is relevant, because of the globalization covers all areas of human activity as a process.

Key words: Globalization, integration, the gross domestic product, indicators, the international division of labor, production, volume, industrial production, cooperation.

Nowadays, all countries of the world are captured by globalization process. Globalization is a new stage of internationalization of economic life. This process covers the most important changes of social, economic and political development of the world, promotes